



WHY DO PEOPLE BELIEVE IN
MONSTERS?

THE COMPLEXITY OF
CRYPTOZOOLOGY

"I want to believe."

THE X-FILES



THE CRYPTOZOOLOGY SUBCULTURE

WHO ARE THE PEOPLE who spend a significant amount of time, money, and other resources thinking about and searching for Bigfoot, Nessie, and other cryptids? What motivates them? Are they scientists or pseudoscientists? If they are not practicing real science, is it possible to transform cryptozoology into a real science? Is cryptozoology just a hobby of no particular consequence, or does it make genuinely useful contributions—or can it, perhaps, lead to harm?

Whatever the case, the cryptozoological impulse is not new. Monsters have always stirred in the shadows of the imagination, as have sincere efforts to understand them. Projects to describe, categorize, and probe claims of legendary beasts extend back through the modern era and medieval period, to such classical authors as Pliny the Elder.

Journalist Elizabeth Landau put it this way:

Across human societies, variations on mythical creature stories like that of Bigfoot have persisted for thousands of years, and accounts of seeing or hearing them still abound. There may be some basic culture-based need for these fantastical tales, said Todd Disotell, professor of anthropology at New York University.

Monsters represent dark aspects of our subconscious worlds and can be metaphors for the challenges of life, said Karen Sharf, a psychotherapist in New York.

“Some monsters are scary. Some monsters are friendly. Sometimes in movies or myths, we befriend the monster, and it’s just like in our inner world: There are monsters; there are dark aspects that we have to face,” she said.

Humans also have a fascination with the divide between their species and animals, and Bigfoot bridges that gap, said John Hawks, anthropologist at the University of Wisconsin, Madison.

Believing in these creatures and following their trails in the forest is somewhat akin to an amusement park ride: They are safe ways of experiencing fear, said Jacqueline Woolley, professor of psychology at the University of Texas at Austin.¹

As we have explored in this book, reports of mysterious creatures have drawn interest for centuries from natural historians, popular writers, and explorers—and have long fascinated the public as well. That attraction continues to this day. The Baylor Religion Survey found in 2005 that one in five Americans have read a book, consulted a Web site, or otherwise researched “mysterious animals, such as Bigfoot or the Loch Ness Monster.”² Many of

those people are interested because they are persuaded that cryptids exist, but around 13 percent of those who do *not* believe in cryptids have made the effort to seek out information about these hypothetical creatures.³ Co-author Daniel Loxton can relate to both sides of that interest, having been first motivated to devour cryptozoology books by the belief that cryptids exist, only to sustain an enduring fascination with monster mysteries in his later role as a skeptic and critic of the topic. Loxton is not unique in this; many people feel the attractiveness of cryptozoological ideas, even if they are skeptical about the literal existence of cryptids. Disbelievers are not immune to a feeling that Joshua Blu Buhls described as a transcendent interest “shared by Bigfooters, a feeling that united them and underlay all of their activities, their expeditions, their reading, their correspondence. . . . That transcendent interest was love. Bigfooters *loved* the monster.”⁴ Linguist Karen Stollznow, co-host of the skeptical cryptozoology podcast *MonsterTalk*, described a source of that love: “When I was a kid I thought my neighbor had a jungle in her backyard, the tall stories my brother told me about strange creatures were true, the monstrous koalas and wombats of local legend really existed, and the monsters in the books were real. The kid in me now thinks that still.” Her co-host Blake Smith, an incisive skeptical investigator, speaks as well of the tantalizing sense of plausibility that gives cryptozoology its spice—even for doubters: “*What if* it turns out that there really is a primate living in the Pacific Northwest? Or what if some strange tide brings in a frilled sea-serpent? What if a presumed-extinct bird or mammal is found in some remote, exotic locale? I doubt most of these monsters or cryptids are real—but it’s the *what if* that keeps me excited.”⁵

Like other subcultures, cryptozoology is stratified by level of knowledge and involvement. Whether believers or disbelievers, only a subset of those who form an interest in cryptozoological topics go on to pursue cryptozoology as a hobby or sustained area of investigation. Buhls provided an interesting portrait of the subset of the early Bigfoot community that was motivated to actively research Bigfoot—an inner circle of dedicated enthusiasts, but not necessarily the innermost hard core whom we might think of now as “professional” cryptozoological content producers and investigators. Buhls met with George Haas, publisher of the *Bigfoot Bulletin* since 1969. This early cryptozoological zine had a “magical effect: formalizing what had been a private, haphazard exchange of information and welding the disparate Bigfoot enthusiasts into a community.” The zine placed Haas at the center of a lively

analogue social network of hundreds of active correspondents who sent in sightings and documents:

Mostly what Haas received, though, and what the newspaper reported on, were references to books and articles about Bigfoot. Sasquatch enthusiasts were readers first and foremost, cataloguers and archivists. The focus owed something to the Fortean background of many Bigfooters. Subscribers to the *Bigfoot Bulletin* combed through old newspapers, compiled bibliographies—such as one listing all the wild-man articles in *Fate*—and assigned reading. “Homework,” Haas called it. Swapping citations and articles helped to bind the community; it was also another way to demonstrate skill, in the library rather than the woods. Enthusiasts were to gird their loins and seek out musty tomes, plunge into newspaper morgues, battle with microfilm readers, just as Charles Fort had.⁶

Today, the “cataloguers and archivists” level of activity is pursued online, in cryptozoological discussion forums and blogs. Of these active participants, a subset takes the next step to attend cryptozoological events, such as Bigfoot conferences, and only those in a further, smaller group pursue their interest so far as to undertake fieldwork. Buhs found the hard core of amateur cryptozoologists hunting for Bigfoot in the forests of the Pacific Northwest to be mostly white, working-class men for whom Bigfoot is an icon of untamed masculinity; a populist rebel against scientific elites; the last champion of authenticity against a plastic, image-conscious, effeminate consumer society. (Ironically, Bigfoot has a career as advertising mascot and tabloid fodder, making him a major purveyor of consumerism.) Buhs shows that many Bigfoot stalkers participate at this fieldwork level of the subculture because it has the same attractions as other types of hunting: getting back to nature, tramping through the woods in search of elusive prey, and testing their manhood against the wilderness. He quotes Thom Powell: “I think I became interested in the Bigfoot thing because it gave me an excuse to get out and use my wilderness skills. My life-long love of the wilderness exploration has a purpose beyond just getting there and back.” It is an allure familiar not only to hunters, but also to countless thousands of hikers, canoers, campers, birders, and photographers. Buhs quotes a similar sentiment from contractor Tom Morris, who reflected, “Maybe I’m only trying to justify all my trips to the mountains by calling them research. I like wildlife; I like to see anything I can. The more I go, the more I’m amazed at how elusive wildlife can be. I’m happy just to be up there, watching the animals move around. I want to come back with the best pictures I can. The ultimate would be a shot of Bigfoot.”⁷

Few activities have more broad, populist appeal than getting out in the woods. That folksy populism also feeds a common theme across cryptozoology (and especially Bigfoot research): the conflict between amateur cryptid hunters and professional scientists. The amateurs usually resent their treatment by the academics. They believe that if they can find the elusive creatures that science rejects, they will be able to triumph over those who have ignored and ridiculed them for decades. Famously impatient with even pro-Bigfoot academics, Sasquatch pioneer René Dahinden imagined a moment of comeuppance for ivory tower scoffers. “I’d take the scientists by the scruff of their collective necks and rub their goddamn faces in—actually, I would like to see all the people—the scientists—who have opened their mouths and made their stupid, ignorant statements, fired from their jobs,” Dahinden felt. “They should totally, absolutely, right then and there, without pension, without anything, just be taken and thrown out the front door. Then and there.”⁸ If the dream of the discovery of a cryptid should one day be realized, Buhs explained, “those who had always known the truth, those who had come to the right conclusion by the dint of hard work and the application of skill, would receive the dignity that the world had otherwise denied them.”⁹

Historian of science Brian Regal has discussed the genuine conflicts between professional scientists and the largely amateur cryptozoologists, but has shown that the narrative of conflict can also be complicated by the presence of some academics among the cryptozoologists and by the willingness of some scientists to review the evidence presented by cryptid hunters.¹⁰ A number of disincentives—disdain from colleagues, damage to reputation, possible denial of tenure, and so on—can prevent academics from voicing sympathy for unconventional views or pursuing long-shot possibilities. But there is also the problem of the attitudes of amateurs who have no idea how science works and cannot understand why their obsession with flimsy anecdotal and trace evidence, such as sightings and tracks, does not convince professional scientists. There is not only a large communication gap between the two communities, but also a culture gap, exacerbated by the contrast between the less educated Bigfoot fans and the “academic elite” whom they feel scorns and disrespects them.

Monster proponents have long complained that academics do not give their ideas a fair shake and never look into their evidence. Consider this complaint as it was articulated by science popularizer Gerald Durrell in his introduction to Bernard Heuvelmans’s cryptozoology classic, *On the Track of Unknown Animals*. “Of course, scientists want positive proof of the existence of

these ‘mythical’ creatures in the shape of skins and skulls,” Durrell acknowledged, “but they would make much better use of their energies in looking for them, rather than wasting their time desperately trying to disprove the few bits of evidence we have.”¹¹ This time-worn cliché echoes throughout the whole of the literature of the paranormal; at least in relation to cryptozoology, however, it is a barb that lands wide of the mark. After all, Heuvelmans and Durrell were themselves respectable authorities in zoology, and they were hardly alone.

Monsters have always attracted a trickle of advocates from within the academy, and they continue to do so.¹² When scientific figures as prominent in their times as geologist Louis Agassiz and rocketry pioneer Willy Ley have promoted cryptids, it is clear that the “scientists won’t look at the evidence” argument has been hollow for well over a century.¹³ In more recent decades, Grover Krantz and Jeff Meldrum, both professors of anthropology at major universities, retained their posts despite their quests to find Bigfoot. More important, this complaint discounts the fairly large number of scholars who have spent significant time evaluating cryptid evidence, only to conclude in good faith that it was inadequate. For example, when Ivan Sanderson and Heuvelmans (founders of cryptozoology as a modern movement) were taken in by the Minnesota Iceman, a supposed Bigfoot carcass encased in ice and displayed as a sideshow attraction,¹⁴ scientists at the Smithsonian Institution, such as paleoanthropologist John Napier and director S. Dillon Ripley (who were old hands in the search for Yeti), were eager rather than reluctant to examine the discovery. The problem in that case was not institutional bias against the evidence, but the suspicious slipperiness of the evidence offered—or, rather, not offered. When the scientists asked for permission to see the carcass, the mysterious exhibitor suddenly backpedaled and claimed that the original specimen had been replaced by a model. The Smithsonian scientists learned that the Minnesota Iceman was probably a hoax created by a Hollywood model maker; only at that point, after they were denied the opportunity to examine the specimen, did they withdraw their interest.¹⁵

Nor were scientists unwilling to consider the film shot by Roger Patterson and Bob Gimlin, which supposedly shows Bigfoot walking across a riverbed and looking back toward the camera. When cryptozoologists brought the film to the American Museum of Natural History in New York in 1967 to get the museum’s experienced anthropologists and mammalogists to give it their seal of approval, busy scientists took time out of their schedules of serious

research to view it. They watched the film, quietly thanked the cryptozoologists for coming, and showed no further interest in viewing it a second time—because in their expert understanding of mammals and especially apes, the creature was clearly a hoax. Scientists were similarly willing to view the footage at the University of British Columbia, at the Smithsonian, and at other institutions as well.¹⁶ Despite the widespread belief among monster hunters that cryptozoological evidence is frozen out of consideration by scholars, this pattern is quite typical: when plausible evidence is brought forward, scientists are generally willing to examine it and give their good faith assessment. But cryptozoologists do not always like what the scientists have to say. When the assessments of the scientists differ from the hopes of the cryptozoologists, that disagreement becomes “evidence” of the closed-mindedness of the very scientists who were most willing to review the evidence. Broad expert consensus that the creature in the Patterson–Gimlin film was a hoax did not, for example, convince Bigfoot proponents that the film was an unreliable plank in their case for the Sasquatch, but instead convinced them that scientists were unreasonable or lacked integrity. “My God,” responded Dahinden, “what *do* you have to show them before they’ll take it seriously?”¹⁷

Such distrustful, dismissive responses to expert opinion effectively punish open-mindedness from scientists, who quickly learn that their views will be disregarded and their time wasted. Some, like mammalogist Sydney Anderson of the American Museum of Natural History, eventually become fed up with not only obvious hoaxes, but also the stream of mail they receive from cryptozoologists demanding that they spend their precious time investigating their claims or requesting that the institutions for which they work fund amateur expeditions. That Anderson and his colleagues at the museum had even given a few minutes to cryptozoologists made them the target of endless cryptid-related media requests in the years that followed—so many requests that Anderson eventually resorted to a terse brush-off: “I don’t think [cryptids] exist. My fee for writing is 10 cents per word.”¹⁸ It is even common for scientists who share their time to be rewarded with accusations of conspiracy. When Napier and the Smithsonian withdrew their initial interest in the Minnesota Iceman, for example, this triggered accusations of a cover-up. As Napier recalled, one story even “suggested that the Mafia, who were credited with having an unspecified interest in the matter, were bringing their considerable influence to bear to stop any further scientific investigations being carried out by myself on behalf of the Smithsonian.”¹⁹

SIGNIFICANT FIGURES IN CRYPTOZOOLOGY

Before we look further into the psychology of cryptozoology, we should pause to consider a few of the figures who played significant roles in forming the modern ideas, rhetoric, and movement of cryptozoology—especially a few of those who started their careers as mainstream scientists and then became cryptozoologists later in life. The classic example is Roy Mackal (b. 1925), who spent his early career working in microbiology, in which he earned a good reputation and got tenure at the University of Chicago. Based on his background, he is qualified to do research only as a microbiologist; he has no formal training in systematics, field biology, or ecology, which might qualify him to hunt for exotic creatures. On a visit to London in 1965, he took a side trip to Scotland, visited Loch Ness, and met with the local Nessie researchers, who had founded the Loch Ness Investigation Bureau. Mackal soon was spending a lot of time at Loch Ness, helping with the monitoring, trying to develop new means of detection, and eventually becoming the head of the project. One evening in 1970, according to an interview he gave in 1981, he finally had his reward. He saw, some 30 yards away, “the back of the animal, rising eight feet out of the water, rolling, twisting. If that’s a fish, I thought, it’s a mighty fish indeed! To this day, when someone asks me, ‘Do you believe there is a monster in Loch Ness?’ my stomach does a somersault. I know what I saw.”²⁰ Although there are hints that his sighting may not have been as persuasive in the moment as he later recalled—as he said, “For days I refused to admit that I had seen, with my own eyes, one of the strange animals in Loch Ness”²¹—this sighting led to his writing a book on the Loch Ness monster.²² It also solidified his commitment to cryptozoology in general. “From then on, I knew the Loch Ness monsters existed. This state of mind has remained with me and most certainly has predisposed me to be receptive to reports of other unidentified animals,” Mackal reflected. When confronted with reports of Mokele Mbembe, “I was ready to listen.”²³ Mackal mounted two expeditions to the Congo (where he found nothing) and published a book on his search for the alleged dinosaur. Since then, he has largely been retired and not very active in cryptozoology, although old footage of him talking about Nessie or Mokele Mbembe when he was younger often reappears on television shows that promote cryptozoology.

Cryptozoologists have often promoted “Professor Roy Mackal, Ph.D.” as one of their leading figures and one of the few with a legitimate doctorate in

biology. What is rarely mentioned, however, is that he had no training that would qualify him to undertake competent research on exotic animals. This raises the specter of “credential mongering,” by which an individual or organization flaunts a person’s graduate degree as proof of expertise, even though his or her training is not specifically relevant to the field under consideration. This strategy is employed dishonestly by creationists, who flaunt their degrees in hydraulics or biochemistry as proof that they are legitimate scientists, but then make arguments about paleontology or evolutionary biology—fields in which they have had no training—and quickly show that they are incompetent. Mackal’s knowledge of microscopic organisms does not necessarily translate into expertise about stalking large animals, any more than it translates into expertise about repairing cars or taming lions or playing the harpsichord. Nor does it equate to domain knowledge of the literature of cryptozoology itself. There may not be degrees in monsterology, but we can assure you from painful experience that there is, nonetheless, a good deal to know. No less a cryptozoological heavyweight than Bernard Heuvelmans made this exact point in a scathing review of Mackal’s book *The Monsters of Loch Ness*. Correctly noting the “extensive literature” pertaining to the Loch Ness monster, Heuvelmans described Mackal as “a person who presents himself as a specialist in this problem (in fact the most qualified specialist), but who is unaware, or acts as if he were unaware, of this previous work.” In Heuvelmans’s view, Mackal used his academic credentials to present “himself from the very beginning as the long-awaited Messiah”—as the first person qualified to bring scientific rigor to the investigation of the Loch Ness monster. (Heuvelmans added without apparent irony that he previously felt as though Mackal “were one of my disciples.”)²⁴

The founder of the modern cryptozoology movement, the French-born, Belgian-raised zoologist Bernard Heuvelmans (1916–2001), earned a doctorate in zoology in France in 1939, studying the teeth of the aardvark. He was a student of the eccentric zoologist Serge Frechkop, whose greatest claim to fame was his support of the discredited theory of initial bipedalism (which argued that all mammals were initially bipedal).²⁵ Heuvelmans apparently never had formal training in field biology or ecology, disciplines that were in their infancy when he was trained and that could have qualified him to find cryptids. He performed as a jazz musician and a comedian as well as worked as a writer. During World War II, he managed to escape after being captured by the Nazis, and he spent the rest of war evading the Gestapo. (Ironically, he

was a close friend of and a consultant to the Belgian artist and comics writer Georges Remi, known as Hergé, the author of the series *The Adventures of Tintin*—and a Nazi sympathizer.) Heuvelmans was interested in cryptids from an early age and credited a magazine article by Ivan Sanderson for having stimulated his interest in unknown animals.²⁶ For most of his career, he worked as a freelance researcher and writer, earning his living and financing his expeditions from the sale of his books and publication of his articles. His most famous work, *On the Track of Unknown Animals*, established him as the “father of cryptozoology,”²⁷ and he (along with Roy Mackal and Richard Greenwell) founded the International Society of Cryptozoology (ISC) in 1982.

Richard Greenwell (1942–2005) did not have a doctorate in any field relevant to cryptozoology (but received an honorary doctorate late in his life), although he did research on living mammals and published papers on mammalogy in peer-reviewed journals. He held the position of research coordinator for the Office of Arid Land Studies at the University of Arizona. Most of his time, however, was spent writing about cryptids and joining expeditions to find them. As one of the co-founders of the ISC, he was largely responsible for maintaining the *ISC Newsletter* and the journal *Cryptozoology* from 1982 until 1996, when they ceased publication. More than any other prominent cryptozoologist, Greenwell tried to rein in the rampant speculation and unscientific aspects of cryptozoology. In several articles, he proposed the establishment of rigorous standards for cryptid research. Despite his efforts, the ISC had financial problems and folded in 1998.

The final major figure among the founders of cryptozoology was the Scottish zoologist Ivan Sanderson (1911–1973), who is often credited with coining the term “cryptozoology.” He earned a bachelor’s degree in zoology and master’s degrees in botany and geology at Cambridge University, and was truly an accomplished field zoologist, with many discoveries to his credit. Despite his credentials, Sanderson resented the academic zoologists with doctoral degrees who did not take his work seriously. Sanderson also apparently served as a spy for the Allies during World War II, using his cover as a field zoologist to gather information for British intelligence. He spent much of his career as a major media figure, doing interviews about wildlife and field zoology, first on the radio and then on the early television talk shows; writing articles for popular magazines; and publishing books about his exploits. But early in his career, he not only argued that cryptids were real, but wrote books and articles on a wide variety of other paranormal phenomena, such as the

Yeti, UFOs, Atlantis, and the Bermuda Triangle, and other “vile vortices.”²⁸ Cryptozoologists are fond of pointing to Sanderson as a true field biologist who believed in cryptids, but he did almost all his fieldwork in the 1920s (as a teenager) and 1930s, when very little was known about many parts of the world and few major biological surveys of remote regions were undertaken.

Historian Brian Regal details the stories of a number of the other prominent figures in cryptozoological research, a few of whom were formally trained in fields of study relevant to their work in cryptozoology.²⁹ They include Grover Krantz (1931–2002), who was an accomplished anthropologist with expertise in human hand and foot mechanics. But he also spent most of his time obsessed with Bigfoot, which (as Regal documents in detail) caused tremendous problems at Washington State University, where he was a professor. Some of his troubles, however, were self-inflicted: he was notorious for his feuds not only with fellow academics, but also with other Bigfoot researchers; his writings were problematic because he failed to cite evidence to support his assertions; and his late work was rejected because his research was outdated, not taking into account the discoveries in genetics and fossil primates that made the existence of Bigfoot less and less probable. As Joshua Blu Buhs showed, Krantz also became more and more a gullible believer and less and less a critical skeptic of the bad evidence as his commitment to Bigfoot increased. He proclaimed that he could unerringly distinguish real from fake Bigfoot tracks—and then a source sent him a “track” that Krantz proclaimed as real, only to have its source show that it was another clever hoax that had taken very little skill to produce.³⁰ As Buhs and Regal describe it, Krantz retired from Washington State in 1998 an embittered man, as both the credibility of Bigfoot in the scientific community and his own standing as a scientist had plummeted.³¹ He died still proclaiming that he had an infallible way to show that Bigfoot was real—rumored to involve fingerprint-like “dermal ridges” in Sasquatch tracks³²—but refused to disclose the secret.

Almost all the “old guard,” who founded and nurtured the “golden age of cryptozoology,” as Regal called it,³³ are dead or inactive, and scientists who lent their names to the board of directors of the ISC are dead or very old. Even as early as 1993, cryptozoologists were being called an “endangered species.”³⁴ The ISC is extinct—along with its journal, newsletter, and Web site—because it suffered from perpetual financial problems, the journal issues were often years late, and the field never expanded with more scholarship, as all professional societies must. With the death of the ISC, cryptozoology no lon-

ger has a formal professional organization with the pretense of serious scholarship. Loren Coleman still keeps one Web site active,³⁵ and many other sites are maintained by fans of Bigfoot and Nessie. A few cryptozoologists are in major academic positions, like Bigfoot advocate Jeff Meldrum at Idaho State University, but as both Buhs and Regal point out, much of the academic energy and scholarly force of the ISC and its supporters has vanished, and the field is once again the domain of amateurs.³⁶

At the same time, the heart of the cryptozoological enterprise may be changing. The rise of skeptical cryptozoological scholarship by academics—including folklorist Michel Meurger, classical folklorist Adrienne Mayor, and paleozoologist Darren Naish—suggests a path forward for a kind of “post-cryptid cryptozoology”: a folkloristic cryptozoology that investigates animal-themed mysteries without any particular expectation of discovering new species.³⁷ Like other areas of fringe science, the value and energy of amateur cryptozoological scholarship may depend on neglect by professional scholars. In that sense, the call for greater attention from mainstream academics may be self-destructive to cryptozoology, with the arrival of professionals displacing both the popular voices and the working assumptions that so far have unified the cryptozoology community.

Another side of the cryptozoology movement has a motive utterly opposed to that of the academically inclined researchers who wish to bring more science to cryptozoology: the creationists who wish to use cryptozoology to bring science down.³⁸ One cryptozoology Web site lists among the biographies of famous cryptozoologists those of such creationists as William Gibbons and Kent Hovind.³⁹ Creationists are the major players in the search for Mokele Mbembe and other cryptids said to resemble prehistoric reptiles, not because of their curiosity about nature, but because of their mistaken belief that the discovery of such cryptids will overthrow evolutionary biology. As Gibbons puts it,

The very idea of dinosaurs—those “terrible lizards”—still living in some remote corner of the world today threatens to evoke sidesplitting laughter from the modern paleontologist. . . . Yet, there are a few dissenting voices within the scientific community, although often marginalized, that beg to differ—and for good reason.

According to conventional evolutionary wisdom, the last of the dinosaurs became extinct over 65 million years ago during a period known as “the great dying.” . . . So teach the colorful books and science publications that have shaped the thinking of the generations since Darwin. However, is this really the case?

Throughout history, over 200 cultures around the world have left us with a rich and detailed record of monstrous creatures that they knew as “dragons.” . . . From such evidence as the Behemoth of Job 41 to the historical records of 16th century England, and present-day eyewitness accounts, I propose that dinosaurs, or at least creatures that look remarkably like them, are still very much with us today in the dark and remote recesses of our modern, fast-paced world.⁴⁰

This conviction is absurd and shows no understanding of science. To begin with, it is not difficult to find dinosaurs surviving into the present day. There may be some in your backyard right now. They are called birds. If additional groups of surviving dinosaurs (or of other prehistoric reptiles of interest to cryptozoologists, such as plesiosaurs or pterosaurs) were discovered in Loch Ness or the Congo Basin, they would just be additional, late-surviving descendents of groups known from fossils. There are many such “living fossils,” including the coelacanth, three genera of lungfish, the horseshoe crab, monoplacophoran mollusks, trioniid bivalves, and lingulid brachiopods,⁴¹ not to mention sharks, crocodiles, and turtles. Further such discoveries would only cause paleontologists to reassess why those creatures did not leave a more complete fossil record, not overthrow the enormous body of evidence that evolution occurred (and is still occurring). The creationists are openly anti-scientific, trying to overthrow not only evolutionary biology, but paleontology, astronomy, anthropology, and any other field that conflicts with a literal reading of Genesis.⁴²

The credentials of the creationist cryptozoologists are even less credible in field biology than are those of most amateur cryptid hunters. Gibbons has a degree in religious education from a seminary, and Hovind promoted untruths about the fossil record and evolution from his pulpit in Pensacola, Florida. He even had the gall to call himself Dr. Dino, even though he knows nothing about paleontology and his “doctorate” is from a purely religious school that does not even pretend to be able to grant secular academic degrees.⁴³ His dissertation is a short paper that contains no original research, but does include numerous errors in spelling, citation, and reasoning.⁴⁴ Dr. Dino’s methods finally caught up with him: he was convicted of tax evasion in 2007 and was sentenced to ten years in federal prison.⁴⁵ The presence of such creationists in the cryptozoology community further damages its chances of being taken seriously as a legitimate field of scholarship.

WHY DO PEOPLE BELIEVE IN MONSTERS?

Roy Mackal, Bernard Heuvelmans, Richard Greenwell, Ivan Sanderson, Grover Krantz, and Karl Shuker are exceptions among cryptozoologists. They were among the few who had formal science education and training, even though most of them did not have training in a science that is specifically relevant to cryptozoology. What about the rest of the people who believe in cryptids? What can be said about them beyond the anecdotal descriptions of the Bigfoot subculture that begins this chapter?

Before looking further at the psychology of cryptozoology, let us briefly consider the wider topic of paranormal belief—"paranormal" being the umbrella under which cryptozoology is typically placed. (This is a widely adopted and, we think, useful convention, but it conflicts with standard definitions of the word "paranormal" as meaning something like "inexplicable by or incompatible with current science"—in effect, supernatural or outside physical law. By that standard, homeopathy should be considered paranormal, for example, while more classic "paranormal" subjects like Bigfoot, Atlantis, and UFOs should not. Sociologists tend to define the paranormal as beliefs and experiences that are "dually rejected—not accepted by science and not typically associated with mainstream religion"—or those ideas unified by the distinction that "traditional science regards their existence or validity as so improbable as to be all but impossible."⁴⁶ By these latter definitions—or by the even simpler "stuff you'd see on *The X-Files*" rule of thumb—cryptozoology is a paranormal topic.)

Rigorous, large-scale studies have been conducted to determine what the population of the United States as a whole, and what kinds of people in particular, think about paranormal subjects. Well-known examples include the series of polls of paranormal beliefs conducted by the Gallup organization since 1990 and the Baylor Religion Survey, which is a huge data set of answers to multiple-choice questions collected since 2005 that looks not only at religious and paranormal beliefs, but also at the demographic data behind them. These very broad surveys are complemented by in-depth studies of specific populations of paranormal believers, such as the psychologist Susan Clancy's experimental work with people who believe that they have been abducted by space aliens.⁴⁷ Across the board, the evidence indicates that the clichés about the fringe nature of paranormal belief are wrong: paranormal beliefs are not at all uncommon; they are not restricted to people who are socially marginalized; nor are they a sign of low intelligence or poor mental health.

It is important to understand that essentially everybody believes in things that scientists consider to be either unproven, implausible, or demonstrably false. When polled about even very short lists of ten or so ideas selected from the hundreds of paranormal and pseudoscientific notions critiqued in the skeptical literature, *large majorities of the population* readily affirm that they hold one or more of those paranormal beliefs. In 2005, Gallup's survey found that 73 percent of American adults affirm at least one paranormal belief from a list of ten; 57 percent believe in at least two of those ideas; and 43 percent believe in three or more.⁴⁸ These numbers are not unusual, but are consistent with other findings. In *Paranormal America*, a book based on the Baylor Religion Survey data, sociologists Christopher Bader, F. Carson Mencken, and Joseph Baker discuss their similar finding that most Americans agree with one or more items from a short list of paranormal beliefs:

Outside the halls of the academy a broader stereotype is often applied to paranormal believers—people who believe in or have experienced the paranormal are “different.” People who do not believe in the paranormal are perceived to be normal; those who believe in paranormal topics are considered weird, unconventional, strange, or deviant.

There is a big problem with this simplistic assessment—believing in something paranormal has become the norm in our society. When asked if they believe in the reality of nine different paranormal subjects including telekinesis, fortune-telling, astrology, communication with the dead, haunted houses, ghosts, Atlantis, UFOs and monsters, over two-thirds of Americans (68%) believe in at least one. In a strictly numerical sense, people who do not believe in anything paranormal are now the “odd men out” in American society. Less than a third of Americans (32%) are dismissive of all nine subjects. What this means is that distinguishing between people who do and do not believe or experience the paranormal is increasingly less useful. Rather, people may be more readily distinguishing [*sic*] by *how much* of the paranormal they find credible.⁴⁹

The demographics of paranormal belief in general and of any given belief in particular naturally vary with those factors that you would expect, such as age, sex, education, religion, political party affiliation, and income—but not necessarily *as* you might expect. For a counterintuitive example, respondents in the Baylor survey who identified themselves as adhering to “no religion” were considerably more likely than evangelical Protestants to affirm a belief in haunted houses.⁵⁰ Other predictors were perhaps more surprising, such as marital status and cohabitation: marriage predicts less involvement with the

paranormal, while cohabitation predicts more. Married people claimed fewer paranormal beliefs than unmarried, and when asked whether they have had any of five paranormal experiences (such as consulting a psychic, using a Ouija board to contact spirits, or spotting a UFO), unmarried respondents claimed about two such experiences, while married respondents claimed less than one on average. But cohabitating people held almost twice as many paranormal beliefs as non-cohabitating people.⁵¹

Among gender differences, women were more likely than men in general to affirm belief in the paranormal ideas included in the Baylor survey—twice as likely to accept mediumistic communication with the dead, psychic powers, or astrology. Men held greater levels of belief in only one item: the claim that “some UFOs are probably spaceships from other worlds.”⁵² Why this should be is a matter of considerable discussion and speculation. “Women tend to want to improve themselves, to become better people,” suggested Bader, who is also a director of the Association of Religion Data Archives. “Men tend to want to go out and capture something, to prove it’s real.”⁵³ However, women respondents in the Baylor survey were also more likely than men to accept the existence of cryptids—a finding that flies in the face of stereotypes about cryptozoology—although men followed close behind women on this item (as well as in belief in Atlantis). We recommend caution about jumping to conclusions about the role of gender in paranormal belief. The effects of gender vary with the year of the survey and the age of the respondent; and, as we explore further in the case of cryptozoology, the demographics within each paranormal subtopic are more complicated than they appear.

Pop culture stereotypes might lead us to mistakenly anticipate some correlations that turn out not to exist in the Baylor data. Rather than paranormalism predicting isolation from mainstream activities (or vice versa), the Baylor researchers found “no evidence that involvement in conventional activities deters belief in the paranormal.” Involvement in one or more cultural organizations, fraternities, trade unions, sports, or civic or service groups had no discernable impact on the number of paranormal beliefs a respondent held or the number of paranormal experiences that person reported. Regardless of community involvement, people affirmed their belief in an average of about two of the paranormal items included on the survey.⁵⁴

According to Bader, Mencken, and Baker, as age and income increase, belief in alien visitors, ghosts, psychic abilities, and other paranormal phenomena noticeably decreases (although paranormal beliefs are common at

all ages and levels of income). Party affiliation is also related: independents report the most paranormal beliefs, followed by Democrats and Republicans.⁵⁵ Considered in combination, the researchers said, investments in a conventional lifestyle (such as college education, marriage, and mainstream religiosity) tend to reduce paranormal beliefs. These relationships could be plausibly described in more than one way. Among the possible explanations is the hypothesis favored by Bader, Mencken, and Baker that people are more likely to explore new ideas when they are less invested in conventional lifestyles: “As stakes in conformity increase, paranormal beliefs and experiences steadily and markedly decrease. A person with the highest stakes in conformity accepts on average only two paranormal beliefs. This is less than half the level of belief exhibited by those with the lowest stakes in conformity.”⁵⁶ Nonetheless, even the most conventional people generally hold paranormal beliefs. As Mencken adds,

All humans are seeking enlightenment and discovery. New information helps us to reduce risk in our lives, and to make better informed decisions. Many paranormal practices (psychics, mediums, communication with the dead, astrology, etc.) are about giving people an insight into their future. Those groups not bound to conventional religious systems are freer to explore these alternative systems in order to gain information that may help them improve their lives.

Both the undereducated poor and the hyper-educated cultural elites may feel that sort of freedom to explore—or, rather, may feel less bound to the status quo. “Since conventional religiosity is for and run by highly conventional people and provides many empirical rewards for this group,” Mencken notes, “those from lower socioeconomic status groups will not gain many spiritual or conventional rewards from participating in conventional religion. Alternative beliefs systems can be empowering.” On the other end of the spectrum, “those who are hyper-educated, or cultural elites, may condemn conventional norms of behavior as too bourgeois.”⁵⁷

No matter how you slice it, the paranormal thrives in every category and level of society. A sizable literature of sociological research has attempted to make sense of why so many people accept so many paranormal claims. Some hypotheses include

- *Deviance*: People who strongly embrace paranormal ideas are thought to be outside the norms of society and so are defined by sociologists as “devi-

ant.” In sociology, deviance theory is focused largely on criminals and others who violate the rules of society, often in an extreme way (such as mass murder). Bader, Mencken, and Baker generally subscribe to the approach proposed by criminologist Travis Hirschi, in which deviant or unconventional behavior is less costly, and therefore a more readily selected option, to those who have invested less in conformity.⁵⁸ By this reasoning, people with lower levels of education, income, marriage attachments, church participation, or involvement with community activities should tend to subscribe to a larger number of paranormal beliefs. The Baylor data offer some support for this view, but with a number of caveats. Churchgoing correlates with paranormal belief, for example, but the relationship is not straightforward. (Those who attend church once a month claim more belief in paranormal ideas than those who never attend church, and also more than those who attend church more than once per month.)⁵⁹ Involvement in community activities has no relationship to paranormal belief. Furthermore, some groups of people who are very invested in the paranormal are also very conventional. Members of Bigfoot hunting groups, for example, tend to be so conventional in most ways that Bader, Mencken, and Baker “might even call them hyperconventional.”⁶⁰ Moreover, if belief in the reality of some paranormal phenomena is the norm in our society, can those who hold those normal ideas truly be considered deviant?

- *Wish for control*: Our increasingly complex world is impossible for most of us to understand—from our enormous government to the instantaneously changing global economy to our technologically complicated electronic devices. As researchers who have studied religious cults and many other fringe movements have shown, humans have a deep longing for a simpler world that they can better comprehend—even if this hope is no longer realistic. Thus those who embrace an alternative worldview may gain the subjective benefit of feeling they have more meaning in and control over their lives.
- *“Small steps” hypothesis*: According to this model, people who already accept one kind of supernatural belief system (such as religion) are likely to accept others (such as paranormal ideas), since it is only a small step from embracing one to embracing many. The complication is that the largest subset of believers in the paranormal accept only a single paranormal be-

lief. The next largest accepts only two, and so on. (In this sense, those Bigfoot researchers who are actively hostile to paranormal beliefs other than the existence of Bigfoot are very typical of paranormal believers.) In the Baylor Religion Survey of 2005, fully 19 percent of respondents held one paranormal belief, 16 percent held two paranormal beliefs, 10 percent held three—and the remainder declined steadily in the same pattern, with only 2 percent of respondents affirming nine paranormal beliefs. Gallup found a similar pattern that same year, with 16 percent of respondents claiming one paranormal belief and only 1 percent affirming ten such beliefs.⁶¹ The “small steps” hypothesis is further complicated by the fact that paranormal ideas are not discrete, equally weighted units of belief, and the steps from one belief to another are not always equally difficult. Some paranormal beliefs imply or suggest others, or are at least easily compatible, while others conflict. (Premonitory dreams are conceptually more similar to fortune-telling than to alien abduction, for example.)

Whatever the range of factors at play, the psychology and sociology of paranormal belief are as kaleidoscopic and colorful as any other window into the human experience. A sharper focus on a specific subcategory or community of paranormal believers only complicates this perspective further—and further dispels simplistic stereotypes. Consider those who believe that they were abducted by aliens (surely Hollywood’s favorite go-to cliché for wild-eyed, aluminum foil hat-wearing kooks). In 2003, Bader reported the results of his survey of alien abductees, which were consistent with previous research on new religious movements: abductees are not only much better educated than the general population, but also more likely to hold white-collar jobs.⁶² Commenting on both this research and the Baylor Religion Survey data, Bader and his co-authors wrote in *Paranormal America*,

Unless we choose to define someone as a fringe member of society simply because they claim to have been abducted by aliens or are chasing Bigfoot . . . abductees are *not* marginal people. Many of the people we met would be better described as elites.

One way to understand why elites might be attracted to the paranormal is to think of paranormal beliefs and experiences as something that is “cutting edge.” Whenever a new technology enters the market there are people who immediately embrace it, people who are excited by new things and ready to take risks. Marketers call such people “early adopters.” Then there are the rest of us, who want to wait

until a new idea or technology is fully proven before we jump aboard. Early adopters tend to be those . . . who have been continually exposed to new ideas throughout their lives via higher education and contacts with other educated people. They also have the resources to try new things.⁶³

This sociological assessment of one sample from the hard-to-study alien abductee population is complemented by Clancy's psychological research with another group of abductees. "There's little evidence that this was a particularly psychopathological group," she found.⁶⁴ Abductees do tend to score highly in assessments of "fantasy proneness" (a normal personality type characterized by vivid imagination and high hypnotizability), and, intriguingly, Clancy's research revealed that they are more prone to creating false memories under laboratory conditions than is the general population—but these are variations on normal functioning.⁶⁵ "What can we say conclusively about this diverse group of abductees?" Clancy asked. "In the end, not much. Research on the topic is clearly in its infancy. What we *can* confidently say is that these people are not crazy."

Returning to cryptozoology, it is clear that this community is no easier to pigeonhole than is that of abductees. The Baylor Religion Survey offers a sense of the very wide interest that American adults have for cryptids. Asked in 2005, "Have you ever read a book, consulted a Web site, or researched the following topics: Mysterious animals, such as Bigfoot or the Loch Ness Monster?" 20 percent of Americans indicated that they had. Men exhibited a little more interest, with about 24 percent replying that they had researched cryptids in some fashion, but more than 17 percent of women had also done so. Interest was similarly high in every age group (highest in the 18 to 30 range, at 32 percent), political affiliation (highest among independents), and religious category (highest among those who claimed to adhere to "no religion"). Interest hovered in the 18 to 24 percent range in every income category, and between 19 and 23.5 percent in every level of education from high school onward.⁶⁶

A lot of people dig monsters, whether they believe in them or not—but it happens that many *do* believe. When asked whether "Creatures such as Bigfoot and the Loch Ness Monster will one day be discovered by science," about 17 percent of the people in the sample agreed (14.2 percent) or strongly agreed (2.7 percent) with that statement. (Those tens of millions of believers in the United States have proved to be tempting targets for at least some preliminary research. For example, psychologists Matthew Sharps, Justin Matthews,

and Janet Asten have attempted to link cryptozoological beliefs with the tendency to exhibit features of attention deficit hyperactivity disorder [ADHD]. They found some correlation with measures of the component hyperactivity or impulsivity in isolation, but “no significant relationship” between overall ADHD tendencies and cryptozoological beliefs.)⁶⁷

At this level of involvement with cryptozoology—*belief* in the probability of cryptids, as opposed to motivation to research the topic—an interesting demographic reversal occurred in the Baylor Religion Survey data: more women than men agreed that cryptids will one day be discovered. It is a fairly slim margin (17.6 percent of women either agreed or strongly agreed, compared with 15.9 percent of men), but the difference is visible in the “strongly agree” range, so those respondents might plausibly be thought of as serious believers in cryptozoology. Further, women also dominated the undecideds, making them considerably less likely than men to assert that cryptids do *not* exist. Just under 53 percent of women disagreed or strongly disagreed that cryptids will one day be discovered, compared with almost 61 percent of men.⁶⁸

The Baylor Religion Survey found that women continued to lead the way when asked a more direct question in 2007: “In your opinion, does each of the following exist? Bigfoot,” with 17.5 percent of women agreeing that Bigfoot either “absolutely” (3.2 percent) or “probably” (14.3 percent) does exist. Fewer men expressed belief at either level of confidence, with 2.9 percent believing that Bigfoot absolutely does exist, and 11.7 percent thinking that it probably is real (with 14.6 percent of men accepting Bigfoot overall).⁶⁹

A more recent poll by Angus Reid Public Opinion, conducted in 2012, found even higher levels of belief in Bigfoot in both Canada (21 percent) and the United States (29 percent) than had been found in 2007, with men in both countries only slightly more likely than women to give an affirmative answer to the question “Do you think Bigfoot (also known as Sasquatch) is real?” In Canada, 3 percent of women and 2 percent of men said that Bigfoot “definitely is real,” while 15 percent of women and 21 percent of men said that it “probably is real.” In the United States, 8 percent of women and 6 percent of men said that Bigfoot “definitely is real,” while 19 percent of women and 25 percent of men said that it “probably is real.” In both countries, women led not only among those who felt certain that Sasquatches exist, but also among respondents who answered “not sure.” Among the 17 percent of Britons who gave a positive answer to a similar Angus Reid question, “Do you think the Loch Ness monster is real?” women were more likely than men to say that

Nessie “definitely is real” (3 percent of women compared with 2 percent of men) or “probably is real” (15 percent of women compared with 13 percent of men) or to respond that they were “not sure.”⁷⁰

If women are roughly as likely to believe in cryptids as are men (or possibly even more likely; the differences tend to be near the margins of error in relevant polls), why does cryptozoology have such a strong reputation as a “boy’s topic”? The answer appears to hinge on the distinction between *belief in cryptids* and *participation in cryptozoology*. It is a distinction that also applies to other areas of belief, such as religion. Identifying with a religion or holding beliefs associated with that religion is not the same as participating in the rituals or practices of that religion, such as churchgoing. In addition to belief and practice, sociologists distinguish other dimensions of involvement with religion that can be usefully applied to paranormal belief communities, such as knowledge of the topic, personal experiences (consider eyewitness sightings of Bigfoot), and consequences suffered as a result of involvement (such as ridicule). In regard to cryptozoology, it seems that women are more likely to *believe*, while men are (for whatever reason) more likely to *practice*. This lopsidedness toward male involvement begins at the most basic level of participation in cryptozoology (reading a book or consulting a Web site) and increases at each more active level of engagement.

To explore the *subculture* of cryptozoology, sociologists Bader, Mencken, and Baker got to know the Bigfoot community of East Texas and even accompanied some dedicated Bigfoot hunters on a late-night search for the creature.⁷¹ The sociologists soon found that they “were among very normal people talking about a very strange subject.”⁷² Bigfooters have formed their own subculture of people who believe strongly in the reality of Bigfoot and who spend a significant amount of time and resources researching and hunting Bigfoot and following the internal goings-on within the Bigfoot community itself. They hold their own meetings, speak their own jargon, share their own body of accepted knowledge, and have their own distinctive way of looking at the world. In all these characteristics, Bigfoot believers reflect the typical pattern of any subculture, from other dedicated cryptozoologists to ghost hunters to fans of any other subject—be it NASCAR or vampires, opera or scientific skepticism.

In 2009, Bader, Mencken, and Baker attended the annual Texas Bigfoot Research Conference in Tyler, Texas, where they were permitted to administer an anonymous questionnaire to the attendees.⁷³ They found the confer-

ence of nearly 400 Bigfoot enthusiasts to be much like any other convention of any other interest group. Celebrities of the cryptozoology world like Loren Coleman, Bob Gimlin, and Smoky Crabtree (known for the movie about his Bigfoot experience, *The Legend of Boggy Creek*) spent much of their time in the hallways and the auditorium posing for photographs and signing books. Exhibitors selling books, DVDs, T-shirts, and every other sort of Bigfoot merchandise filled the hallways. Most of the attendees knew the Bigfoot legends and evidence backward and forward, and they spoke in shorthand about the “Skookum cast,” the “PG [Patterson–Gimlin] film,” the “Ohio howl,” and the “shoot/don’t shoot” controversy (whether a Bigfoot hunter should actually shoot or not if he finds Bigfoot).⁷⁴ As sociologists have long pointed out, learning the argot, or distinctive lingo, of a subculture is part of the process of becoming a member of the subculture, and using the jargon is a way to distinguish insiders from outsiders and is a mark of acceptance when initiates master it.

Strikingly absent were the sort of colorful characters who might attend a typical comic-book or science-fiction gathering like Comic-Con or Dragon-Con. Although the researchers were by this time familiar with the Bigfoot subculture, they “were still surprised by the staid nature of the conference and the conventionality of most of those in attendance.” The conferees were mostly conservatively dressed, middle-aged, middle-class white people who attended a day-long slate of presentations. The large majority—67 percent—were male.⁷⁵ Nor did attendees at the Texas Bigfoot Research Conference merely look conventional; by key measures, they were. They were better educated than average Americans, better paid, and more likely to be married.⁷⁶

All this was disappointing to reporter Mike Leggett, who wrote about his experience at the conference that same year:

Bigfoot is boring.

Correction. Bigfoot conferences are boring. . . .

I went to the 2009 Texas Bigfoot Conference expecting people in gorilla suits milling about among semi-crazed gangs of gonzo, tattooed, barrel-chested bean-dips. I found instead only a polite, older crowd of mildly sleepy true believers who only came alive at the mention of the TV show “MonsterQuest” or the movie “The Legend of Boggy Creek.” I thought surely someone would be selling BLT—Bigfoot, lettuce and tomato—sandwiches and Abominable Snowman cones during the lunch break, but there were only Cokes and Subway sandwiches.⁷⁷

Bader, Mencken, and Baker found the attendees even more conventional—and 88 percent male—when they restricted their focus to the subset who could be considered “Bigfoot hunters” by virtue of belonging to an organization devoted to Bigfoot field research. These Bigfoot hunters were notable not only for their high income and education level, but also for their conventionally high church attendance and their marital status (77 percent were married, compared with 57 percent of Americans in general in 2009).⁷⁸

Psychologists and sociologists do not yet fully understand all the complex motivations that make people embrace unconventional beliefs like cryptozoology, although research is beginning to tease apart some of the questions.

IS CRYPTOZOOLOGY SCIENCE? CAN IT BE MADE SCIENTIFIC?

Cryptozoology has the reputation of being part of a general pseudoscientific fringe—just one more facet of paranormal belief. Given Bigfooters’ humdrum appearance and attempt to portray themselves as serious scientific researchers trying to track down just another species of primate, it should not be surprising that they typically try to avoid any association with other paranormal beliefs, which they scorn as unscientific. Despite this sentiment, the dividing line between cryptozoology and the paranormal is unclear—and to some extent artificial.

While cryptozoology need not be considered “paranormal” by all definitions (cryptids are usually conceived as flesh-and-blood creatures, not as phenomena outside known physical laws), it is difficult to avoid the association when such visible figures in cryptozoology as Ivan Sanderson and Jon-Erik Beckjord have also advocated for a range of other paranormal phenomena. More important, it is fairly common for cryptozoological testimony to include paranormal or supernatural elements—much more common than most cryptozoologists prefer to admit. “Paranormal folkloric entities, whether ghosts, vampires, or lycanthropes, are not cryptozoological,” insists cryptozoology micro-publisher Chad Arment,⁷⁹ but Loren Coleman discusses modern American sightings of creatures with a “classic werewolf look,” which he includes in his book about Mothman—a UFO- and Men in Black-associated, flying, humanoid cryptid with glowing red eyes!⁸⁰ Like Mothman, Bigfoot often has been described as having glowing red eyes or has been connected with other, even more mysterious lights, such as a luminous sphere carried in the hand or the glowing bronze light that rose from one Bigfoot’s hiding place in the woods and shot away into the sky.⁸¹

The connection between Bigfoot and UFOs is especially strong. For example, Christopher Bader, F. Carson Mencken, and Joseph Baker discuss a well-known incident that occurred in the vicinity of Uniontown, Pennsylvania, in 1973, in which two huge ape-like creatures with glowing green eyes allegedly appeared alongside a radiant white dome 100 feet in diameter.⁸² This is not an especially unusual report. In one 1974 case, two witnesses allegedly saw several Sasquatches in the vicinity of a bright red, hovering light that rotated like a police car's beacon.⁸³ In 1976, one man saw a Bigfoot in Montana and also spotted a hovering gray UFO half a mile away.⁸⁴ In 1983, logger Stan Johnson claimed that a certain Bigfoot Allone of the Rowe family of Bigfeet had explained to him that the Bigfoot Peoples are from the fifth dimension, where they originally lived on the planet Centuris. When Centuris was about to be destroyed, the Bigfoot Peoples were rescued by beings from the nearby planet Arice. They then lived happily on Arice until the rise of an evil ruler caused some of them to come to Earth during the last Ice Age. Here they competed with dinosaurs and rampaging cave dwellers. (This story has all the confusion of prehistoric events found in pop-culture entertainment like *The Flintstones*, as well as creationist chronology. Perhaps not surprisingly, Johnson also claimed that the Bigfeet pray "to God, and to Jesus Christ.") There was a war on Earth between good and bad Bigfeet, both of which still live in remote regions of Earth.⁸⁵

Some Bigfoot followers claim that Sasquatches can vanish into thin air⁸⁶ or that they are shape-shifters—or even that they are "paraphysical, inter-dimensional nature people that are profoundly psychic."⁸⁷ The late Jon-Erik Beckjord (a persona non grata among more conventional Bigfoot researchers) regularly appeared on radio talk shows, *Today*, and *Late Night with David Letterman*. During many public appearances, he asserted that Bigfoot is a shape-shifter that cannot be caught or shot and that can "manipulate the light spectrum they're in so that people can't see them." Bigfoot uses its telepathic powers to sense the presence of humans, and it shares a "space-time origin and connection with UFOs and come[s] from an alternate universe by a wormhole."⁸⁸

(Supernatural elements are not restricted to the subtopic of Bigfoot, but are found intertwined with the lore of, testimony about, and modern search for many cryptids. For example, a video of what was purported to be the Loch Ness monster that made global media waves in 2007 was shot by a man who also claimed to have filmed fairies.⁸⁹ One of the top ten or so photographs of the Loch Ness monster was shot by a man who claimed to have successfully

summoned Nessie using a team of psychics.⁹⁰ Second in Nessie fame to only the Surgeon's Photograph, Robert Rines's "flipper" pictures were apparently captured with the psychic assistance of a local dowser.⁹¹ The vampiric chupacabra (goat sucker) is as much a part of UFOlogy as it is of cryptozoology. From fortune-telling mermen to Scandinavian lake serpents whose appearance foretells the rise and fall of royal dynasties, monsters and the supernatural have always gone hand in hand.)

Many cryptozoologists are unhappy that the boundaries between their area of interest and other paranormal subcultures are so thin and so frequently crossed—so unhappy that some prominent cryptozoology portals do not permit any mention of the paranormal, even for the purpose of relevant comparison.⁹² The impulse to sanitize away the monster literature's supernatural elements is very old; even classical authors attempted to demythologize the lore of fabulous animals. Such selective filtering can lead, warned folklorist Michel Meurger, to "gross distortion" of the very testimony on which cryptozoology depends in the first place.⁹³ But it is easy to sympathize with cryptozoologists who refuse to entertain "any ludicrous paranormal, occultic or supernatural viewpoints when discussing the nature and origins of such animals" when they know all too well that "it is hard enough making a case for [cryptids] as flesh and blood biological entities without having to deal with quasi-scientific nonsense."⁹⁴ It is a difficult situation: skeptics justifiably complain when cryptozoologists sweep the supernatural aspects of cryptid testimony under the rug, and yet skeptics also justifiably complain that cryptozoology is not sufficiently scientific (as we are about to do here once again). How are cryptozoologists supposed to be taken seriously or to aspire to any sort of scientific rigor when they are lumped together with believers in ghosts and Atlantis and alien abduction? As Aaron Bauer and Anthony Russell put it: "Cryptozoology as a science suffers from an image problem. Many critics regard cryptozoology as the bailiwick of the fringe element, of credulous individuals with no real credentials as scientific researchers. Certainly, the field does attract a disproportionate number of adherents whose interests tend toward the bizarre, and even to the supernatural."⁹⁵

Nor are cryptozoology's problems limited to poor public relations. The fact is that cryptozoology has deep and ongoing challenges of focus and quality control. These challenges are not lost on cryptozoologists themselves, as we see in a stinging editorial from John Kirk:

No other scientific field sees the kind of half-cocked, pseudoscientific babble that cryptozoology seems to produce. . . . Once you jettison science, the whole field of cryptozoology collapses into a pit of speculation and conjecture. . . . We get to the finish line when we have completed a thorough and exhaustive examination of actual tangible pieces of evidence which are utterly irrefutable. This is the standard that applies to all other areas of science be they mathematics, biology, physics, chemistry or biology. Nothing else is acceptable. Now please . . . keep your “skepticals” on.⁹⁶

Richard Greenwell was another among those who pushed cryptozoologists to raise their scientific standards and look more critically at the evidence. For example, he was skeptical about a photograph of the alleged monster of Lake Champlain and was not even sure that it shows a living thing.⁹⁷ His article on the black cat of Puerto Penasco debunks the myths that had grown around a story about a huge 5-foot-long black panther in Mexico.⁹⁸ Throughout the *ISC Newsletter*, he sprinkled quotes about the importance of science and the philosophy of science.

In 1985, Greenwell published an influential article in which he suggested a classification scheme for unknown animals—from the conventional creatures that are discovered and named every year to the extreme cryptids that most scientists reject. His classification scheme has seven categories: I–IV, which include animals that are known and described; and V–VII, which contain creatures that are unconventional. For instance, animals in category IV are known taxa that may survive, even though they are thought to be extinct in historic times. As examples, Greenwell gave the White-winged Petrel and the marsupial thylacine (which is known as the “Tasmanian wolf” or “Tasmanian tiger” and appears on the coat of arms of Tasmania).⁹⁹ The petrel was thought to be extinct but was rediscovered, while the last known thylacine died in a zoo in 1936 and wild Tasmanian tigers have not been seen since. These animals are unremarkable, since there is physical evidence that they existed—in the form of the petrels themselves and the last tigers in the zoo—and most scientists would consider it surprising but not shocking if the thylacine still survives.

But then Greenwell made the error of false equivalence of categories. Category V includes animals that are known from fossils, but may have survived into historic times. For a precedent, he gave the coelacanth, and then claimed that the plesiosaur fits that category, too. This reasoning may also include the

alleged dinosaur Mokele Mbembe as well as Bigfoot or the Yeti as a surviving *Gigantopithecus*—but by any classification system, the existence of one “living fossil” does not imply the survival of another. Coelacanths live in very deep water in only a few areas along the perimeter of the Indian Ocean (from South Africa to Indonesia). Given how rare they are and how seldom they come near the surface, it is not surprising that they were not found until 1938. But plesiosaurs were surface-dwelling, air-breathing reptiles that lived in the tropical waters of the epicontinental seas and the Tethys Sea during the Cretaceous period (144–65 million years ago), and it is extremely unlikely that any survive. Not only is it geologically impossible that lakes like Loch Ness harbor them, but the excellent fossil record of marine vertebrates of all sizes, from seals to whales, includes not a single plesiosaur fossil in any rocks younger than 65 million years. Greenwell made a serious error in conflating the idea that just because coelacanths were first known from fossils, *any* extinct creature can conceivably have survived into the present. Some prehistoric survivor-type cryptids would be harder to overlook than others, in either the living world or the fossil record.

Despite Greenwell’s attempts to raise the scientific standards of cryptozoology, it continues to be performed as it has always been performed, and its methods leave a lot to be desired. Almost any piece of evidence, no matter how weak or incredible, is taken seriously, and eyewitness accounts are given much more weight than modern psychological research shows they deserve.¹⁰⁰ As geologist and cryptozoology critic Sharon Hill explained,

I’ve researched and published on why amateur investigation groups fail to reach the high bar of science. I see these groups doing what I call “sham inquiry.” It sounds sciencey, it looks sciencey, and it can fool a lot of people into thinking it’s scientific but there are clear reasons why it is not. “Sham inquiry” is about the process and why the results they get out of that process are inferior to scientific inquiry.

The primary problem . . . is that cryptozoologists, by and large, assume that a mystery creature is out there for them to find. They begin with a bias. . . . They are not testing a hypothesis but instead seeking evidence to support their position. . . . They also begin with the wrong question. Instead of “what happened?” they ask “Is it a cryptid?” . . .

Some are worse than others, for sure. I admire many so-called cryptozoologists. . . . I don’t admire when the basic ideals of science are ignored—good scholarship in research, quality data collection and documentation, proper publication, skepticism, and open criticism. Instead, the bulk of popular cryptozoology is a

jumble of the same old poor-quality evidence, a ton of hype, rampant speculation and unfounded assumptions, even conspiracy theories, and, too often, paranormal explanations.

I want to make two clarifications. First, amateurs and non-scientists CAN do science. And, second, cryptozoology CAN be a science. But right now, I don't see that occurring often. It takes a lot of effort to do this and resources that the average enthusiast does not have. Too much is missing to call cryptozoology a science at this moment in time.¹⁰¹

If its adherents want cryptozoology to be taken seriously as true science, rather than as pseudoscience or "sham inquiry," they have to begin to play by the rules of real science. At a minimum, they must

- *Rethink their fundamental assumptions:* As Hill pointed out, in response to an odd occurrence or sighting, the cryptozoologists' first thought is: Is it a cryptid? or, worse, Is it cryptid X? But they should start several steps back, and ask the more basic scientific question: What really happened? One of the most powerful rules of science is Occam's razor: *the simplest explanation is usually the best*, because it involves the fewest leaps or assumptions. Generally speaking, it is a good idea not to invoke additional "what if" forces or factors or creatures unless the evidence really demands it. Real scientists do not try to force the data to fit their expectations and biases, but consider all hypotheses that explain the circumstances and rule them out, one by one. This is neatly captured in another aphorism that has long been favored in medical circles: "When you hear hoofbeats in the night, think first of horses, not of zebras." Almost every cryptozoological "observation" or bit of "evidence" can be plausibly accounted for by simple explanations that involve animals and phenomena that we know to be real, such as bears, boat wakes, and practical jokes. Cryptozoologists tend to preferentially and prematurely discard these simpler explanations in favor of the more desirable, less parsimonious assumptions that support their views.
- *Test the null hypothesis:* Related to this point is a concept in science that comes from statistics: the null hypothesis. Most statistical tests begin with the assumption that the null hypothesis is true and indicate whether there is enough evidence to reasonably reject it. Applied to testable scientific

claims (for example, plesiosaurs live in Loch Ness), the null hypothesis is that the hypothesis formed by the researcher is *not* true or that the effect or animal or relationship hypothesized does *not* exist. In an experiment, a researcher might treat one group of subjects differently from another group to determine if the treatment makes the groups different in another way. For example, he might leave two slices of bread in the sun for several hours, covering one with plastic wrap, and then compare the amount of mold that grows on each. The null hypothesis is that plastic wrap will not affect the amount of mold that grows. However, if the researcher has a good reason to think that it should and there is significantly more mold on the covered slice than on the other, he can reasonably reject the null hypothesis.

Applied more generally, the null hypothesis is that what we know about the world is accurate. We continue to accept that hypothesis until we have sufficient evidence to reject it in favor of an alternative hypothesis. In other words, the default scientific assumption is that any strange observation can be explained by known natural causes; the less likely explanation—cryptid activity or paranormal phenomena—should be accepted only when all natural causes can be ruled out.

- *Meet the burden of proof:* In the sciences, most conventional ideas require only modest evidence to show that they are reasonable. But the more extreme the idea, the greater the burden of proof required. As Marcello Truzzi said, “An extraordinary claim requires extraordinary proof,” and Carl Sagan echoed, “Extraordinary claims require extraordinary evidence.”¹⁰² The evidence needed to support the claims of cryptozoologists does not have to be as “extraordinary” as that required to overturn the germ theory of disease, for example, but it must be sufficiently strong and solid to overcome the long history of failure of all organized attempts to find any cryptid or any part of any cryptid. It follows from the claim that eyewitnesses fairly often see cryptids that carcasses or bones of those cryptids should also fairly often appear—but they do not. The absence of physical remains is not just a lack of evidence for cryptids, but strong positive evidence that hypothesized cryptids do not exist. This evidence against cryptids could be overbalanced by robust evidence *for* cryptids, but that would take more than easily faked footprints, inconsistent “eyewitness accounts,” or inconclusive photographs or videos.

- *Collect high-quality data:* There is still no credible physical evidence in the form of carcasses, bones, hair, or other biological samples to support the claims for the existence of cryptids. This is the barest minimum that scientists demand to establish the existence of any cryptid (or any new animal species). Even crisp, high-resolution photographs or videos are merely suggestive (when those are available, which is rare in a field that gives us the cliché of the distant, blurry “blobsquatch”). Cryptozoologists take eyewitness testimony, which is subject to error, far too seriously, while simultaneously failing to be serious about how they collect that testimony. They tend not to take sufficient care to question stories, even when those stories are clearly false; they fail to quarantine prize evidence that is associated with known hoaxers and to disclose when evidence is so contaminated; and they often exaggerate or misreport accounts when they compile them. It is far too rare for cryptozoologists to do the necessary hard work of consulting primary documents or of interviewing witnesses and double-checking their stories for consistency and cultural bias, which Benjamin Radford and Joe Nickell discovered in their investigations of a number of purported cryptids.¹⁰³ When they do interview witnesses, they may often lead the witnesses to desired testimony.
- *Publish work that meets scientific standards:* Scholars and scientists like Darren Naish, Leigh Van Valen, Christine Janis, Colin Groves, and Adrienne Mayor not only regularly publish mainstream academic papers, but also occasionally write articles on topics of interest to cryptozoologists (such as the possibility of prehistoric animals having survived into the historical past and influenced human mythology) or on the chance of presumed extinct creatures, such as the marsupial thylacine, having held on in remote areas of the world. These scientists publish their papers in peer-reviewed scientific journals, and their work exhibits the appropriate degree of skepticism and caution. Most cryptozoologists, however, write only for their like-minded audience, publish in their own journals and on their own Web sites, and make no effort to write high-quality papers with proper documentation that could be accepted by a mainstream science journal.
- *Be open to criticism:* All scientists must acknowledge that peer review is a harsh process that bruises the ego and can be biased or unfair at times. But good scientists have a thick skin, a strong sense of the merits of their re-

search, a desire to improve their methods or look for better approaches, and the will to persevere to get their best work published. Such peer criticism is essential because it guarantees that only the best scientific work eventually is published. When, in the face of criticism, cryptozoologists claim that scientists are not open-minded about their ideas and then retreat to their own comfort zones, they are doing themselves a disservice. If they accepted the criticism as a call to base their work on hard evidence and to meet the other standards of scientific research, they would find that the scientific community is remarkably receptive to publishing unconventional ideas.

- *Be skeptical of their own data:* Good scientists must be skeptical of their own work as well as that of others. They have to be willing to toss out data or results if they are not good enough to support their hypotheses. As Richard Feynman said, “The first principle is that you must not fool yourself—and you are the easiest person to fool.” If cryptozoologists want to be taken seriously, they must undertake the hard task of weeding out the questionable sightings and inconclusive photographs and videos of cryptids; be more careful in their scholarship about what eyewitnesses actually said; and be honest when their preferred ideas are not supported by the facts.

WHY DOES CRYPTOZOOLOGY MATTER?

There is no solid evidence that any of the cryptids discussed in this book exist and much evidence that their existence is extremely unlikely. Nevertheless, a large number of people continue to believe that they are real, no matter how much evidence to the contrary is accumulated and how often the stories of sightings are debunked.

People are entitled to believe whatever they wish. As Michael Shermer has shown, such beliefs can serve a function in the human psyche, allowing people a sense of the mysterious and the magical and an escape from mundane reality.¹⁰⁴ In prescientific times, the myths about monsters bound the members of society by a set of shared beliefs and values. Similarly, Bigfoot hunters derive a sense of satisfaction, community, and purpose from their wanderings in the woods, even if every attempt to find their cryptid has failed. Like members of other subcultures (including the skeptical subculture in which the authors of this book participate), Bigfooters enjoy the camaraderie when they take part in Bigfoot conferences and buy Bigfoot merchandise.

But scientists do not have the option of accepting something on the basis of belief alone. Instead, they must follow the evidence and examine any source of data critically, from both the subjects' and their own biases. Daniel Cohen, who writes about both science and the paranormal, addressed the hard reality of scientific endeavor: "It is genuinely exciting to believe in ghosts or flying saucers or the Abominable Snowman or the Lost Continent of Atlantis. Real science is nowhere near so thrilling, no matter how well it is presented. A rigorous logical approach to evidence is hard and restrictive; it destroys the beloved romantic myths and is going to be resented. It is a terrible day for a child when he discovers that Santa Claus does not exist, and adults are not much different."¹⁰⁵

You might ask: Why should we even care what cryptozoologists think? How are they doing society any harm? Whatever your personal feelings about cryptozoology, and whatever your assessment of the evidence for cryptids, the answer to this "harm" question may be less obvious than it appears. On the one hand, even if one or more cryptids exist, the field of cryptozoology could have social costs that cryptozoology enthusiasts discount (perhaps by eroding confidence in the methods of science or by tempting advocates into beliefs that damage their reputations). On the other hand, even if all beliefs in cryptids are uniformly mistaken, the field could have little social cost—or even a net benefit (perhaps by encouraging outdoor activity or inspiring interest in zoology). Before drawing hasty conclusions, it is worth considering these words of caution from psychologist Ray Hyman:

Why should we care? This question, in various guises, inevitably comes up in press conferences and in talks by skeptics. I vividly recall a press conference in the early days of CSICOP [Committee for the Scientific Investigation of Claims of the Paranormal]. A reporter asked why the group was so concerned about the growing belief in the paranormal. What harm does it do if someone believes that Uri Geller can bend a spoon with his mind? Besides, aren't there more important problems to worry about, such as the population explosion, famine, the homeless, drugs, acid rain, nuclear proliferation, and so on?

Some of my colleagues immediately jumped in to defend the importance of their mission. One referred to the Jim Jones tragedy in Guyana. Another pointed out that belief in the paranormal made Hitler and Nazism possible. One skeptic stood up and dramatically announced that he had in his briefcase several suicide letters by young students who believed they would come back in better incarnations after their deaths.

To me such reflex reactions are no better than the pathetic arguments that believers make for the existence of poltergeists, prophetic dreams, ghosts, and the like. In no case could any of those skeptics' assertions be backed up with anything resembling scientific evidence.

I believe we should be more careful about how we justify our concerns. We should not make rash claims or feel the necessity to sensationalize the possibilities.¹⁰⁶

What are some plausible costs and consequences of cryptozoology? Or is that the wrong question? Hyman continued, "My own inclination is to admit that I do not know how to measure the amount of harm that comes from belief in the paranormal," but he offered some reasons for scholars to concern themselves with the study of paranormal topics: some paranormal claims could turn out to be true, in which case they would be very important; whether they are true or not, the study of paranormal beliefs can lead us to important insights about the human mind and belief in general; and paranormal views that are based on "intuition and other nonscientific methods . . . known to induce compelling, but illusory, beliefs" shine a spotlight on the general dangers posed by the weakness of critical thinking skills and the lack of scientific literacy. After all, as Hyman warned, "If members of our society—including generals, business executives, and political leaders—develop their beliefs about the paranormal on such an illusory foundation, what does that tell us about how they are making decisions that affect the state of the world?"¹⁰⁷

The authors of this book are divided in our assessment of the net consequences of cryptozoological beliefs and enthusiasms. Daniel Loxton is quite sympathetic to cryptozoology; Donald Prothero is much more critical.

Coming out of cryptozoology himself, Loxton is inclined to regard monster hunting—even in the permanent absence of any genuine cryptids—in much the same terms as *The Hitchhiker's Guide to the Galaxy's* description of Earth: "mostly harmless." Unlike many of the paranormal topics that skeptics critique, cryptozoology does not ask adherents to reject the laws of physics, partake in unproved or disproved medical treatments, live in terror of alien invaders, or sell their possessions in anticipation of the end of the world. Cryptozoology is not terribly expensive for most people—no more, certainly, than hunting or fishing—and it offers the tangible benefits of any literary hobby or fan community. It encourages the development of skills of reading and historical investigation, and it brings enthusiasts together. Is cryptozoology so different in this respect from the skeptical subculture in which we two participate? As Loxton has put it, whether communities form around

the love of Bigfoot or skepticism or model trains, “finding commonality with other human beings is a good in itself—an *end* in itself. Indeed, in respect to this *particular* end, the ‘skeptical’ part of the skeptical community is largely beside the point.”¹⁰⁸ If fans of monsters find a similar commonality in their shared love of old microfilm and camping trips, is that really so bad? Furthermore, Loxton argues that the love of cryptozoological mysteries may offer some of the same educational benefits that science advocates promote: love of the natural world and experience grappling with the nature of scientific evidence. Extrapolating from his own life experience, Loxton suspects that the cryptozoology literature may as easily and as often become a “gateway drug” for science literacy as it may be for attitudes of resistance to science:

Scientific skepticism turns a critical eye on paranormal and fringe science claims, so it’s usually framed by narratives of tension or conflict (as *X-Files* audiences will recall): either the stubborn, reductive skeptic versus the open-minded, intuitive believer; or, the responsible, science-based thinker versus the foolish kook.

But I have been both, and my experience did not fit into that story of conflict.

I was a believer in everything (a Fox Mulder if ever there was one!) who eventually became a “professional skeptic.” And yet, my life as a skeptical investigator is a seamless continuation from my paranormal enthusiasm: from inquisitive nerd with a passion for weird mysteries, to inquisitive nerd with a passion for weird mysteries. Nothing changed, except the information I had to work with.¹⁰⁹

Loxton suggests three reasons why science-minded skeptics may wish to support the research of cryptozoologists in principle (or at least the freedom to pursue such research), even as they strenuously critique it in particulars:

- Echoing Hyman, there’s the off chance that cryptozoologists could be right. After all, the laws of physics do not have to be overturned in order for the Bigfoot hypothesis to be true—Bigfoot just has to be found. It is plausible on the face of it, although in our view exceedingly unlikely.
- Research into popular mysteries and paranormal beliefs provides a public good: satisfaction of the desire to have subjects of wide popular interest probed and examined. These fringe topics are typically neglected by mainstream scholarship; by studying and chronicling the paranormal, the most responsible writers perform a valuable public service. Indeed, when critical scholars *do* deign to investigate paranormal subjects, they inevitably build their investigations on top of preliminary work that was undertaken

on the fringe. For that reason, as Gerald Durrell emphasized, cryptozoological footwork retains value even in the absence of any genuine cryptids:

Up to now most zoologists have treated the whole subject of sea-serpents, abominable snowmen and similar creatures as something that is not quite nice. It's as though they feel there were some gigantic conspiracy afoot to undermine their ideas of what does and does not exist in the world. This attitude makes it extremely hard to get at the facts behind reports of these alleged creatures. Whether they exist or not, it was essential for someone to collect all the reports and sift them through for publication. If the animals *do* exist and *are* discovered, this book will prove a valuable piece of research. If, on the other hand, it is proved that they do *not* exist, the book loses none of its value, for it becomes an important contribution to zoological mythology.¹¹⁰

- Research into unconventional topics, such as the existence of Bigfoot, provides a barometer of the health of academic freedom. Indeed, such research is what academic freedom is designed to protect. By using that freedom to explore unorthodoxies, scholars who are sympathetic to cryptozoology or the paranormal provide a measure of insurance against academic dogma. As long as the quality and integrity of their work is strong, all of us are better served when scientists and other academics have the freedom to reexamine existing consensus views, dig deeper into unresolved mysteries, pursue long shots, or even waste their time flailing around on the fringes of science.

But is cryptozoology “mostly harmless,” as Loxton believes? For his part, Prothero is not so sure. Whatever the romantic appeal of monster mysteries, cryptozoology as it exists today is unquestionably a pseudoscience. None of the cryptids it purports to study have been demonstrated to exist; the reality of most is exceptionally unlikely; and some, like the Loch Ness monster of popular legend, can be definitively rejected as untrue.

Granted, cryptozoology is less obviously dangerous than are some other pseudoscientific claims, such as the discredited but fiercely promoted speculation that routine vaccinations cause autism or the assertion that HIV does not cause AIDS (a belief that has been calculated to have caused 365,000 premature deaths in South Africa alone).¹¹¹ But aren't these and other fringe topics unified by a common pattern of pseudoscientific thinking? Rather than merely wasting time and resources, the widespread acceptance of the reality of cryptids may feed into the general culture of ignorance, pseudoscience,

and anti-science. The more the paranormal is touted by the media as acceptable and scientifically credible—rather than subjected to the harsh scrutiny of the scientific method, the rigor of critical thinking, and the demand for real evidence—the more people are made vulnerable to the predations of con artists, gurus, and cult leaders. The more the creationist cryptozoologists manage to damage the understanding of science, the worse off we all are.¹¹²

This is a serious problem in a culture where critical thinking is in short supply and basic science literacy is rare. Study after study over the years has shown that the American public has an abysmally poor understanding of how the world really works. For example, a national survey commissioned by the California Academy of Sciences in 2008 found that

- Only 53% of adults know how long it takes for the Earth to revolve around the Sun.
- Only 59% of adults know that the earliest humans and dinosaurs did not live at the same time.
- Only 47% of adults can roughly approximate the percent of the Earth's surface that is covered by water.
- Only 21% of adults answered all three questions correctly.¹¹³

This level of understanding sounds almost too poor to believe, but it is consistent with the findings of many other surveys. In the United States, barely 50 percent of adults know that an electron is smaller than an atom.¹¹⁴ Most adults cannot define concepts like cell, molecule, or DNA. Only about 33 percent of adults agree that humans share more than half their genes with mice; only 38 percent of adults understand that humans share more than half their genes with chimpanzees.¹¹⁵ All but 16 percent agree that the center of Earth is very hot, but only 38 percent know that the Big Bang describes the early history of the universe.¹¹⁶ Moreover, a surprisingly large number of American adults *still think that the sun revolves around Earth!* These people are not limited to just those few dedicated advocates who actively promote geocentrism for religious reasons,¹¹⁷ but include a hefty 18 percent of the United States population at large. (The same misapprehension is held by similar numbers in Germany and the United Kingdom.)¹¹⁸ No one knows how many American adults literally believe that the Earth is flat, but they include a subset of creationists who promote a flat Earth for biblical reasons.¹¹⁹

Another way to frame the question is to ask how the United States stacks up against other countries. Scientific illiteracy is a global challenge, but the United States faces some obstacles to public understanding that are almost uniquely American, such as resistance to the fact of biological evolution. This

particular struggle is especially relevant in the context of the impact of cryptozoology; as we have seen, cryptozoology is frequently employed by creationists to erode confidence in evolution. In a 2005 ranking of thirty-four industrialized countries published in the journal *Science*, the United States scored almost dead last, with a mere 40 percent of citizens accepting evolution. By comparison, the citizens of Iceland, Denmark, Sweden, and France were fully *twice* as likely to affirm that evolution is true. Only Turkey scored worse than the United States; countries like Italy, Hungary, and the Czech Republic left the United States far behind.¹²⁰ In a closer comparison, Canadians are much more likely to accept evolution than are their American counterparts. Both the quality of evolution education and the level of public acceptance of evolution vary by province, but evolution is accepted by 58 percent of the population overall, with only 22 percent advocating creationism.¹²¹ In addition, Canadians generally respect the separation of church and state better than do Americans, since the fundamentalists are not so numerous or powerful in their political system. In contrast, the Republican Party now follows a platform dictated largely by the fundamentalists in its political base, including planks that support creationism, ban abortion and stem-cell research, deny global warming, and ignore the limits of Earth's resources in the face of population growth.

It is a matter for particular concern for Americans that students in the United States lag significantly behind those in many other industrialized nations in science literacy. In 2009, for example, the Programme for International Student Assessment (PISA) of the Organisation for Economic Co-operation and Development found that among fifteen-year-olds, twenty-one countries scored higher in science literacy than the United States. At the top of the list were China and Finland, followed by (among others) Japan, New Zealand, Canada, Australia, the Netherlands, Germany, and the United Kingdom.¹²² Other rankings in recent years give similar results. Although the exact order of the top-ranked countries might be shuffled a bit, science literacy in the United States chronically falls behind that in many other nations, with a dismal twenty-ninth-place finish in the 2006 PISA rankings.¹²³ Students in the United States even lag behind their counterparts in nations like Estonia and Slovenia that have a fraction of our wealth. That alone is a mark of disgrace for American society—that we spend so much money per child, and yet end up with such mediocre results. What does it say for the future economic well-being of the United States if it is outperformed by competitors such as China on such a crucial factor as understanding science? Innovation and sci-

entific output are complex issues weaving many social and economic threads, but public understanding of science is a part of that tapestry.

A recent headline from CNN reads, “China Shoots Up Rankings as Science Power, Study Finds.”¹²⁴ As the article summarizes, a study conducted by the Royal Society, the world’s oldest and foremost scientific organization, found that although the United States is still the dominant scientific power in terms of scientific publications, China has experienced a “meteoric rise” in scientific publications and new research.¹²⁵ In 2003, fewer than 5 percent of scientific articles were published in China. By 2008, 10 percent were, putting China second only to the United States. Meanwhile, the American share of scientific publications dropped from 26 to 21 percent. According to Sir Chris Llewellyn Smith, chair of the advisory group for the study:

The scientific world is changing and new players are fast appearing. Beyond the emergence of China, we see the rise of South-East Asian, Middle Eastern, North African and other nations. The increase in scientific research and collaboration, which can help us to find solutions to the global challenges we now face, is very welcome. However, no historically dominant nation can afford to rest on its laurels if it wants to retain the competitive economic advantage that being a scientific leader brings.¹²⁶

China is shooting up in many rankings, making it the second-largest economic power as well. Seemingly unencumbered by global-warming deniers, stem-cell-research antagonists, or creationists who interfere with science policy, China is making huge investments in new technologies for a world that is facing the consequences of global warming and limited oil,¹²⁷ while the United States and the United Kingdom slip down the rankings of countries investing in green technology.¹²⁸ Germany and several Scandinavian countries have long led the world in their investments in green technology and their commitment to lowering energy use and reducing greenhouse-gas emissions—yet their economies are stronger than those of the United States and most of the nations in southern Europe.¹²⁹

Americans still hold the lion’s share of Nobel Prizes in the sciences and have since 1956, when the effect of Germany’s experiment with Hitler, descent into anti-Semitism, and instigation of World War II caused a “brain drain” of scientists from Germany to the United States and other countries and ended German supremacy in science.¹³⁰ But how long can the American preeminence in science last when the pernicious influences of creationism,

paranormalism, and dedicated anti-science lobbies continue to erode the scientific culture?

Some people deny that the United States, the dominant world power since 1945, could ever cede its place to another country. But dominance is tied to innovation, which is tied to science. As historians have pointed out, many other powerful societies with enormous economic reach and once-flourishing arts and sciences have declined. Only 150 years ago, the British Empire of Queen Victoria spanned the globe, but now Great Britain is a relatively minor player among international powers, as it lost most of its economic dominance and colonial empire during and after World Wars I and II. The once-mighty Soviet Union fell in just a few years in the 1990s, along with the regimes of the nations it controlled. For ten years, the United States has been wasting trillions of dollars on wars that have cost thousands of American lives, while running up huge budget deficits in a time of economic recession. Americans like to think of their country as exceptional, but that is not the lesson that history teaches.

Widespread paranormal and pseudoscientific thinking ought not to be dismissed as charming eccentricity; nor is the endless conveyor belt of monster media merely innocent entertainment. Paranormal hype makes money for its purveyors, but that easy profitability comes at the shared cost of encouraging anti-scientific and anti-rational thinking. Such thinking can be directly harmful, especially when it intersects with public health; moreover, the erosion of scientific understanding robs us of opportunities for success and understanding that we wish for our children. For these reasons, leading American scientists have asked us for decades to reach for higher standards, and asked us to care more deeply about truth. This stuff matters. As astrophysicist Neil deGrasse Tyson explains:

If you are scientifically literate the world looks very different to you. It's not just a lot of mysterious things happening. There is a lot we understand out there. And that understanding empowers you to, first, not be taken advantage of by others who do understand it. And second there are issues that confront society that have science as their foundation. If you are scientifically illiterate, in a way, you are disenfranchising yourself from the democratic process, and you don't even know it.¹³¹

Carl Sagan was even more blunt: "We've arranged a global civilization in which the most critical elements profoundly depend on science and technology. We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster."¹³²

7. WHY DO PEOPLE BELIEVE IN MONSTERS?

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